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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/803,876

03/19/2004

Eiji Ogawa

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EXAMINER

WEATHERBY, ELLSWORTH

ART UNIT

PAPER NUMBER

3768

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/803,876	Applicant(s) OGAWA, EIJI	
	Examiner ELLSWORTH WEATHERBY	Art Unit 3768	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see Remarks, filed 11/13/2007, with respect to the improper application of Trucco et al. as prior art have been fully considered and are persuasive. The 7/13/2007 rejection of claims 1-17 has been withdrawn.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-8 and 16-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Umemura et al. (USPN 5,523,058).

4. Umemura et al. '058 (hereinafter Umemura) teaches an ultrasonic transmitting and receiving apparatus comprising: an ultrasonic array including plural ultrasonic transducers for transmitting ultrasonic waves and receiving ultrasonic echoes reflected from an object to be inspected and signal generating means for generating drive signals for respectively driving the plural ultrasonic transducers (col. 8, ll. 45-67); transmission control means for controlling the drive signal generating means such that ultrasonic waves transmitted from the plural ultrasonic transducers form at least one ultrasonic beam (abstract); signal processing means for performing reception focusing processing on plural detection signals obtained based on the ultrasonic echoes received by the

plural ultrasonic transducers so as to form a reception focal point in at least within the object thereby obtaining plural detection signals relating to the at least one region (abstract; col. 16, ll. 22-45); and calculating means for calculating image data relating to the at least one region on the basis of the plural detection signals relating to the at least one region and the plural different acoustic pressure intensity profiles (col. 6, ll. 15-60; col. 8, l. 51- col. 9, l. 15).

5.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umemura in view of Suzuki et al. (USPN 5,553,618).

8. Umemura teaches all the limitations of the claimed invention except for expressly teaching that the calculating means calculates the image data by obtaining a solution of simultaneous equations which have image data relating to said at least one region as unknown and which are constructed based on the plural detection signals relating to said at least one region and plural acoustic pressure intensity profiles relating to said at least one region.

9. In a similar field of endeavor, Suzuki et al. '618 (hereinafter Suzuki) teaches calculating means that calculates image data by obtaining a solution of simultaneous

equations which have image data relating to said at least one region as unknown and which are constructed based on the plural detection signals relating to at least one region and plural acoustic pressure intensity profiles relating to at least one region (col. 19, ll. 23-59).

10. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Umemura in view of Suzuki. The motivation to modify Umemura in view of Suzuki would have been to extract the level of the degeneration quantitatively, by correcting for the influence due to the temperature change and correcting the signal calculating the relaxation times such as T1 and T2, as taught by Suzuki (col. 19, ll. 23-59).

11. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Umemura in view of Suzuki as applied to claim 9 above, and further in view of Drukarev et al. (USPN 5,105,814).

Umemura in view of Suzuki teaches all the limitations of the claimed invention except for expressly teaching that the calculating means calculates the image data by obtaining vector "x" from an equation $Ax=b$ where "b" represents a vector having components corresponding to the plural detection signals relating to the at least one region, "A" represents a matrix having components corresponding to plural acoustic pressure intensity ratios in plural acoustic pressure intensity profiles relating to the at least one region, and "x" represents a vector having components corresponding to image data relating to the at least one region.

In a similar field, Drukarev et al. 814 (hereinafter Drukarev) teaches a calculating means that calculates image data by obtaining vector "x" from an equation $Ax=b$ where "b" represents a vector having components corresponding to the plural detection signals relating to the at least one region, "A" represents a matrix having components corresponding to plural acoustic pressure intensity ratios in plural acoustic pressure intensity profiles relating to the at least one region, and "x" represents a vector having components corresponding to image data relating to the at least one region. using (col. 9, lines 23-67; col. 10, lines 1-52).

12. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Umemura in view of Suzuki with Drukarev. The motivation to modify Umemura in view of Suzuki with Drukarev would have been to calculate image data through the use of simple, linear algebra.

13. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Umemura in view of Suzuki and Drukarev as applied to claim 9 above, and further in view of Ebbini et al. (PGPub. No. 2003/0212326).

Umemura in view of Suzuki and Drukarev teaches all the limitations of the claimed invention except for expressly teaching that the calculating means obtains the vector "x" by obtaining a generalized inverse matrix of the matrix "A" which satisfies the equation $Ax=b$. Umemura in view of Suzuki and Drukarev also does not expressly teach that the calculating means obtains the vector "x" by performing singular value decomposition on the matrix "A", reducing a rank of the matrix "A" by discarding singular

values less than a predetermined value, and obtaining a generalized inverse matrix of the matrix A' which has a reduced rank. Umemura in view of Suzuki and Drukarev also does not expressly teach that the calculating means obtains a least square solution of the vector " x " which satisfies the equation $Ax=b$ in the case where the matrix " A " have " m " rows and " n " columns where $m>n$. Umemura in view of Suzuki and Drukarev also does not teach a calculating means that obtains the vector " x " by obtaining an inverse matrix $A.\text{sup.}-1$ of the matrix " A " in accordance with one of (i) an exact method including a sweeping-out method and (ii) an iterative method in the case where the matrix " A " is a square matrix and a regular matrix.

Ebbini et al. '326 (hereinafter Ebbini) teaches a calculating means that obtains the vector " x " by obtaining a generalized inverse matrix of the matrix " A " which satisfies the equation $Ax=b$ [0100]. Ebbini also teaches a calculating means obtains the vector " x " by performing singular value decomposition on the matrix " A ", reducing a rank of the matrix " A " by discarding singular values less than a predetermined value, and obtaining a generalized inverse matrix of the matrix A' which has a reduced rank [0101-0103]. Ebbini also teaches a calculating means that obtains a least square solution of the vector " x " which satisfies the equation $Ax=b$ in the case where the matrix " A " have " m " rows and " n " columns where $m>n$ [0099].

14. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Umemura in view of Suzuki and Drukarev with Ebbini. The motivation to modify Umemura in view of Suzuki and Drukarev with Ebbini would have been to use simple linear algebra to simplify the calculations by the calculating unit.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ELLSWORTH WEATHERBY whose telephone number is (571)272-2248. The examiner can normally be reached on M-F 8:30 a.m. - 5:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on (571) 272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EW

/Brian L Casler/

Supervisory Patent Examiner, Art Unit 3737

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